

**Supplemental Table 1. Strong- and moderately-rated evidence linking diet and CVD risk:
Evidence from the 2010 Dietary Guidelines Advisory Committee**

Topic	Conclusion	Grade
MACRONUTRIENTS AND ENERGY		
Is intake of dietary fat associated with adiposity in children?	Moderate evidence from prospective cohort studies suggests that increased intake of dietary fat is associated with greater adiposity in children. However, there were no studies conducted under isocaloric conditions.	Moderate
Is total energy intake associated with adiposity in children?	Moderately strong evidence from recent prospective cohort studies that identified plausible reports of energy intake, support a positive association between total energy (caloric) intake and adiposity in children.	Moderate-Strong
Is dietary energy density associated with adiposity in children?	Moderately strong evidence from methodologically rigorous longitudinal cohort studies of children and adolescents suggests that there is a positive association between dietary energy density and increased adiposity in children.	Moderate-Strong
Is intake of sugar-sweetened beverages associated with adiposity in children?	Strong evidence supports the conclusion that greater intake of sugar-sweetened beverages is associated with increased adiposity in children.	Strong
MICRO NUTRIENTS		
What is the effect of a reduced sodium intake on blood pressure in children from birth to age 18 years?	A moderate body of evidence has documented that as sodium intake decreases, so does blood pressure in children, birth to 18 years of age.	Moderate
Is intake of calcium and/or dairy (milk and milk products) related to adiposity in children?	Moderate evidence suggests that there is no relationship between intake of calcium and/or dairy (milk and milk products) and adiposity in children and adolescents.	Moderate
FOODS AND FOOD ENVIRONMENT		
What is the relationship between the environment, body weight and fruit/vegetable consumption?	An emerging body of evidence has documented the impact of the food environment and select behaviors on body weight in both children and adults. Moderately strong evidence now indicates that the food environment is associated with dietary intake, especially less consumption of	Moderate

	<p>vegetables and fruits and higher body weight. The presence of supermarkets in local neighborhoods and other sources of vegetables and fruits are associated with lower body mass index (BMI), especially for low-income Americans, while lack of supermarkets and long distances to supermarkets are associated with higher BMI. Finally, limited but consistent evidence suggests that increased geographic density of fast food restaurants and convenience stores is also related to increased BMI.</p>	
What is the relationship between eating out and body weight?	<p>Strong and consistent evidence indicates that children and adults who eat fast food are at increased risk of weight gain, overweight and obesity. The strongest documented relationship between fast food and obesity is when one or more fast food meals are consumed per week. There is not enough evidence at this time to similarly evaluate eating out at other types of restaurants and risk of weight gain, overweight and obesity.</p>	Strong
What is the relationship between breakfast and body weight?	<p>Moderate evidence suggests that children who do not eat breakfast are at increased risk of overweight and obesity. The evidence is stronger for adolescents. There is inconsistent evidence that adults who skip breakfast are at increased risk for overweight and obesity.</p>	Moderate
Is breakfast intake associated with achieving recommended nutrient intakes?	<p>Moderate evidence supports a positive relationship between the behavior of breakfast consumption and intakes of certain nutrients in children, adolescents and adults.</p>	Moderate
What is the relationship between portion size and body weight?	<p>Strong evidence documents a positive relationship between portion size and body weight.</p>	Strong
What is the relationship between screen time and body weight?	<p>Strong and consistent evidence in both children and adults shows that screen time is directly associated with increased overweight and obesity. The strongest association is with television screen time.</p>	Strong

Source: Selected from the Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010 (<http://www.cnpp.usda.gov/DGAs2010-DGACReport.htm>) <http://www.nutritionevidencelibrary.com/category.cfm?cid=21> (13)

Grading criteria used in the 2010 U.S. Dietary Guidelines was adapted from the [American Dietetic Association Evidence Analysis Library®](#) and based upon: Greer N, Mosser G, Logan G, Wagstrom Halaas G. A practical approach to evidence grading. The Joint Commission Journal on Quality Improvement. 2000;26:700-712.

Supplemental Table 2. Examples of obesity prevention and treatment interventions in children and adolescents

Reference	Population	Intervention	Outcomes (e.g., Diet, food pattern, nutrients/weight/BMI/blood pressure/blood lipids/glucose /sedentary behavior-TV viewing, physical activity)
Diaz RG et al. Lifestyle intervention in primary care settings improves obesity parameters in Mexican youth. <i>J Am Diet Assoc.</i> 2010;110:285-90. (53)	Mexican youth, 9-17 years; RCT; 12 months, BMI or weight circumference >90 th percentile	Shape Down program adapted for Mexican youth with culturally appropriate topics. 12 weekly 2-hour sessions on improving self-esteem, emotions, communication, and lifestyle behaviors—nutrition, weight regulation, energy balance, physical activity. Dietitian advice and physician consult. Control condition: 10-15 consult with physician, encouraged 30 min PA, food guide pyramid suggestions.	Mean changes in body weight for the lifestyle group and the control group were -0.8 kg (-3.2, 1.5) vs. +5.6 kg (3, 8.2; P<0.001). Mean changes in BMI were -1.8 (-2.6, -0.9) vs. +0.4 (-0.5, 1.3; P<0.001), intervention vs. control, respectively. Significant differences in primary outcomes (weight -3.5 kg, P=0.02; BMI -1.2, P=0.03) in favor of the lifestyle group at 12 months.
Kalarchian MA et al. Family-based treatment of severe pediatric obesity: randomized controlled trial. <i>Pediatrics.</i> 2009;124:1060-8.	192 children 8-12 years old (mean +/- SD: 10.2 +/- 1.2 years). The average BMI percentile for age and gender was 99.18 (SD: 0.72)	Family-based intervention; 20 group meetings, 1 hr each, for 6 mo. Lifestyle coach, 6 group sessions and telephone calls. Intervention focused on Stop Light eating plan ranging from 1200 to 1800 kcal; strategies to increase PA, decreased sedentary hours, decreased emotional eating, goal setting. Control condition-2 nutrition consults. Offered intervention after 18 mo.	Significant decreases in child percent overweight, relative to usual care, at 6 months. Intervention vs. Usual Care - 7.58% vs. 0.66% decrease in child percent overweight at 6 months. .
Vitola BE et al. Weight loss reduces liver fat	8 obese adolescents, BMI	Four-week behavioral therapy sessions; Healthy Habits weight loss program used to	5% stable weight loss for 4 weeks improved hepatic triglycerides by 61.6% , insulin

and improves hepatic and skeletal muscle insulin sensitivity in obese adolescents. <i>Obesity</i> . 2009;17:1744-8.	>95 th percentile, mean age 15.3, tanner stage 4.4.	decrease caloric intake and increase physical activity. 1200 kcal to 1500 kcal/d.	sensitivity in the liver by 56% and in skeletal muscle by 97% .
Reinehr T et al. Lifestyle intervention in obese children is associated with a decrease of the metabolic syndrome prevalence. <i>Atherosclerosis</i> . 2009;207:174-80.	288 obese children, mean age 12.5 years. (10-16 yrs). Metabolic syndrome components at baseline and 1 yr. Control group 186 obese children- no intervention.	"Obeldicks" is 12-month outpatient physical activity, nutrition and behavior therapy intervention Psychological care for 3 mo intensive—nutrition course 1.5 hrs for 6 months, 30min/mo of psychological therapy with family, 3 mo of individual care. Physical activity 1/wk for 12 mo, ball games, jogging, trampoline jumping, and TV reduction. Food based dietary guidance- 15% pro, 55% CHO, 5% sugar, 30% fat.	Lifestyle intervention significantly reduced BMI-z score (mean -0.22; 95%CI -0.18 to -0.26), compared to control (mean +0.15; 95%CI +0.13 to +0.18), and metabolic syndrome prevalence (from 19% to 9%).
Marcus et al. A 4-year, cluster-randomized, controlled childhood obesity prevention study: STOPP. <i>Int J Obes (Lond)</i> . 2009;33:408-17. (52)	3135 boys and girls in grades 1-4 (Sweden). School children- N= 5 intervention schools, and N=5 control schools.	30 min physical activity daily, elimination of sweets and sweetened beverages, increase in whole grains. Low-fat dairy products and whole-grain bread were promoted and all sweets and sweetened drinks were eliminated in intervention schools.. Duration: 4 years, 8/2001 to 6/2005	The prevalence of overweight and obesity decreased by 3.2% (from 20.3 to 17.1) in intervention schools compared with an increase of 2.8% (from 16.1 to 18.9) in control schools (P<0.05). A larger proportion of the children who were initially overweight reached normal weight in the intervention group (14%) compared with the control group (7.5%), P=0.017.

Nowicka P et al. Family weight school treatment: 1-year results in obese adolescents. <i>Int J Pediatr Obes.</i> 2008;3:141-7.	72 obese adolescents 12-19 years old. Referred by pediatrician and school nurses. Duration: 1 year.	Family based intervention consisting of a multidisciplinary team-pediatrician, RD, sports trainer, nurse, family therapist. Whole family approach; focus on solutions and family goals. Four group meetings; family meeting with Pediatrician for 10 min; intervention tool box with nutrition messages, portion sizes, limited intake of nutrient poor foods, increase in fruits and vegetables, 60 min physical activity.	Intervention group with initial BMI z-score < 3.5 significantly reduced BMI z-scores in both genders (-0.09 +/- 0.04, p = 0.039) compared with those in the control group with initial BMI z-score < 3.5.
Woo J et al. Effectiveness of a lifestyle modification programme in weight management in obese subjects after cessation of treatment with Orlistat. <i>J Eval Clin Pract.</i> 2007;13:853-9.	Fifty-five subjects with and without diabetes mellitus.	Lifestyle modification program or to usual care after 6 months' treatment with Orlistat. Nutritionist-led intervention consisted of dietary management, physical activity, peer group support and discussion using techniques of self-monitoring, stimulus control and cognitive restructuring.	Intervention group maintained their weight loss and favorable anthropometric, metabolic, dietary intake, physical activity and quality of life profiles, while most parameters deteriorated in the usual care group, being more marked in subjects with diabetes.
Saelens BE et al. Efficacy of maintenance treatment approaches for childhood overweight: a randomized controlled trial. <i>JAMA.</i> 2007;298:1661-73.	204 healthy 7- to 12-year-olds, 20% to 100% above median body mass index (BMI) for age and sex, with at least 1 overweight parent.	5 months weight loss treatment followed randomization into 1 of 3 maintenance conditions-- control group, 4 months of behavioral skills maintenance (BSM), or social facilitation maintenance (SFM) treatment. Follow-up assessments 1 and 2 years following randomization. .	BSM or SFM maintained relative weight significantly better than children assigned to the control group (P< =.01 for all; effect sizes d = 0.72-0.96; mean changes in BMI z scores = -0.04, -0.04, -0.05, and 0.05 for BSM alone, SFM alone, BSM and SFM together, and the control group, respectively). Active maintenance treatment efficacy relative to the control group declined during follow-up, but the effects of SFM alone (P = .03; d = 0.45; mean change in BMI z score = -0.24) and when analyzed

			together with BSM ($P = .04$; $d = 0.38$; mean change in BMI z score = -0.22) were significantly better than the control group (mean change in BMI z score = -0.06) when examining BMI z score outcomes from baseline to 2-year follow-up.
Savoye M et al. Effects of a weight management program on body composition and metabolic parameters in overweight children: a controlled trial. <i>JAMA</i> . 2007;297:2697-704.	209 overweight children (body mass index [BMI] >95th percentile for age and sex), ages 8 to 16 years of mixed ethnic groups.	Participants were randomly assigned to either a control ($n=69$, traditional clinical weight management counseling every 6 months), or a weight management group ($n = 105$, an intensive family-based program including exercise, nutrition, and behavior modification). Intervention occurred biweekly the first 6 months, bimonthly thereafter.	Six-month improvements were sustained at 12 months in weight management vs. control, including changes in the following (mean [95% confidence interval]): weight ($+0.3$ kg [-1.4 to 2.0] vs. $+7.7$ kg [5.3 to 10.0]); BMI (-1.7 [-2.3 to -1.1] vs. $+1.6$ [0.8 to 2.3]); body fat (-3.7 kg [-5.4 to -2.1] vs. $+5.5$ kg [3.2 to 7.8]); and HOMA-IR (-1.52 [-1.93 to -1.01] vs. $+0.90$ [-0.07 to 2.05]).
Kalavainen MP et al. Clinical efficacy of group-based treatment of childhood obesity compared with routinely given individual counseling. <i>Int J Obes (Lond)</i> . 2007;31:1500-8.	70 obese children (weight for height 115-182%) aged 7-9 years. children)..	Two-arm intervention: 1) routine counseling (two appointments for children) or 2) family-based group treatment (15 separate sessions for parents). Sessions included nutrition education, physical activity education and behavioral therapy Children's weights and heights were measured at baseline, after the 6-month intervention and after the 6-month follow-up.	Children attending the group treatment lost more weight for height (6.8%) than children receiving routine counseling (1.8%) ($P=0.001$). The respective decreases in BMI were 0.8 vs. 0.0 ($P=0.003$) and in BMI-SDS 0.3 vs. 0.2 ($P=0.022$).

Supplemental Table 3. Lipid and Lipoprotein Distributions in Children and Adolescents, Aged 5-19 Years

	Males			Females		
	5-9y	10-14y	15-19y	5-9y	10-14y	15-19y
Total Cholesterol, mg/dL						
50 th percentile	153	161	152	164	159	157
75 th percentile	168	173	168	177	171	176
90 th percentile	183	191	183	189	191	198
95 th percentile	186	201	191	197	205	208
Triglyceride, mg/dL						
50 th percentile	48	58	68	57	68	64
75 th percentile	58	74	88	74	85	85
90 th percentile	70	94	125	103	104	112
95 th percentile	85	111	143	120	120	126
LDL, mg/dL						
50 th percentile	90	94	93	98	94	93
75 th percentile	103	109	109	115	110	110
90 th percentile	117	123	123	125	126	129
95 th percentile	129	133	130	140	136	137
HDL, mg/dL						
5 th percentile	38	37	30	36	37	35
10 th percentile	43	40	34	38	40	38
25 th percentile	49	46	39	48	45	43
50 th percentile	55	55	46	52	52	51

Adapted from the Lipid Research Clinics Pediatric Prevalence Study (83).